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ABSTRACT

This research review and theoretical proposal is based on the assumption that curriculum is concerned with methods and content and that the two are interrelated and interdependent in practice; thus, research on teaching is related to curriculum in use and can inform curricular theory. An overview is presented of different types of research on teaching: (1) process-product; (2) Carroll model (investigation of the nature of student tasks and measurement of task accomplishment in terms of time); (3) aptitude-treatment interaction; (4) ethnographic; and (5) teacher thinking. A model is presented for relating these types of research to three different theoretical perspectives: (1) reproductive approach--the teacher viewed as one who transmits or reproduces predetermined curricular goals; (2) constructive approach--teachers and students characterized as processors, creators, and constructors of curriculum content; and (3) reconstructive approach--teachers viewed as critical perceivers who act to reconstruct oppressive societal structures and engage students as co-investigators in identifying, critically reflecting upon, and taking action on curriculum change. (Author/JD)

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APPROACHES TO RESEARCH ON TEACHING: IMPLICATIONS FOR CURRICULAR THEORY AND PRACTICE

June M. Martin

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March 1983

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Abstract

Many researchers note that methods in research on teaching have been atheoretical, that researchers have worked in isolation from each other, and that findings have had limited application to practice. This review and theoretical proposal assumes that curriculum is concerned with method and with content and that the two are interrelated and interdependent in practice; thus, research on teaching is related to curriculum in use and can inform curricular theory. This exposition presents an overview of different types of research on teaching, then introduces a model for relating the types of research on teaching to three different theoretical perspectives (reproductive, constructive, and reconstructive) and to curriculum in use.

APPROACHES TO RESEARCH ON TEACHING: IMPLICATIONS FOR CURRICULAR THEORY AND PRACTICE

June M. Martin[1]

Methods of research on teaching, curricular theory, and curricular practice need better articulation both within their current spheres of influence and in relation to each other. This contention is attested to by many researchers and reviewers who agree that much of the research on teaching is atheoretical or lacks a conceptual framework or focus (e.g., Bellack, 1981, pp. 62-63; Brophy, 1979, p. 738; Dunkin & Biddle, 1974, pp. 12-13, 425; Richer, 1975, pp. 389-391; Sanders, 1981, pp. 9-11; & Shulman, 1981, pp. 10, 11). They say that research methods on teaching and on curriculum theory and practice are influenced by (1) tools and techniques of research and the identification of important variables, (2) the specialization of researchers in particular content areas or methods, and (3) the policy orientations of government funding sources (Brophy, 1979, p. 738; Karabel & Halsey, 1977, pp. 76-77; Rist, 1977, p. 42; & Sanders, 1981, p. 10).

Much of the research on teaching also lacks an articulated connection with curricular practice. While basic research is needed, the assumptions of many studies remain uncriticized; thus findings tend to be uncertainly or inappropriately connected to practice. If interpretations of findings are distorted, or if limitations of studies are not made explicit, then teachers may be misled. If research reports remain esoteric and unrelated to the language of teachers, then teachers will continue to ignore such reports and

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[1]June Martin is a former IRT research intern who worked on the Written Literacy Project, coordinated by Christopher M. Clark and Susan Florio. She is currently completing her doctoral dissertation.

regard them as having little or no relationship to curriculum in use. Research findings don't automatically apply t local classroom situations. Linking premises need to be supplied (Phillips, 1980, p. 19; Sanders, 1981, p. 8).

Researchers can begin to remedy these two deficiencies (atheoretical research and lack of explicit linkage between research and practice)--as some already have--by relating their own data and methodologies to theory, investigating other theoretical approaches and acknowledging their import, collaborating with researchers using these approaches, and working in closer collaboration with teachers.

In recent years, research studies have been identified with either a quantitative or a qualitative paradigm (paradigms: "sets of assumptions about the world which are philosophical, ideological and epistemological") Rist, 1977, p. 43). Bellack (1981), Clark (1979), Eisner (1981), Parlett and Hamilton (1976), and Patton (1975), for example, have enumerated many of the differences between the quantitative and qualitative schools of thought. Quantitative research uses methods of the natural sciences. In general quantitative research in education measures variables likely to cause or predict teacher effectiveness toward student attainment of predetermined knowledge. Qualitative research studies derive their methods mainly from anthropology and sociology (e.g., participant observation). In general these studies explain teaching from the viewpoints of teacher and student participants and describe how knowledge is constructed through social interaction in the classroom setting.

Clark (1979) has identified particular methodologies within each of the two schools of thought: (1) three quantitative approaches (process-product, Carroll model, and aptitude-treatment interaction) with the traditional quantitative paradigm, and (2) two qualitative approaches (ethnographic and

teacher thinking) with the interpretative or qualitative paradigm (see Figure 1).

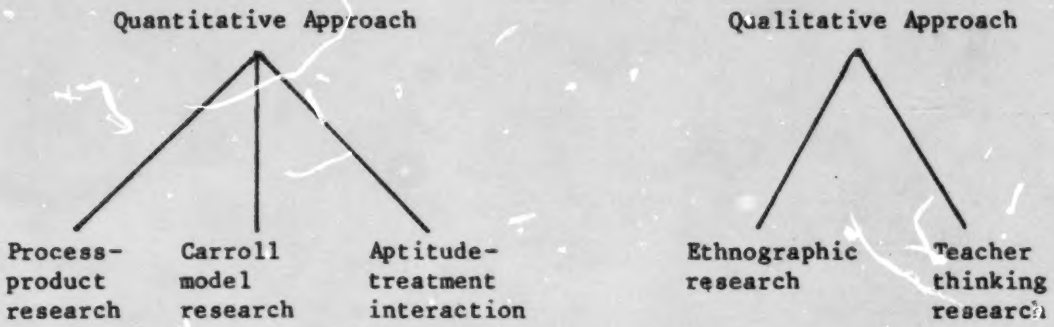


Figure 1. Clark's (1979) perspective on the field of research on teaching.

Other researchers also point out the need to identify divergent methodologies within each paradigm, possible convergences between paradigms, and the need for additional ones (Bellack, 1981, p. 60; Rist, 1977, pp. 42, 48; Shulman, 1981, p. 12). McCutcheon (1981) and Popkewitz and Tabachnick (1982) point out a third paradigm for consideration by researchers on teaching, namely an approach called "critical science." This approach focuses on "the development of an epistemology that takes account of the social bases of understanding," the ways that "structures of domination control the practices of teachers," and the "improvement of practice through processes of critical reflection on the relation between practice and the potential for human emancipation" (Bates, Note 1, p. 3). The three paradigms reflect perspectives on curricular theory, curriculum in use, and research on teaching.

A New Perspective

Historically curriculum theorists have divorced content--the "what" of curriculum, from method--the "how" of curriculum, and each of these from the aims, or outcomes of curriculum practice. More recently curriculum theorists

have contended that content, methods, and outcomes are manifestly interrelated, inextricably intertwined in classroom teaching (Bernstein, 1975; Childress, 1977; Egan, 1978; Eggleston, 1977; Giroux & Penna, 1979). Assuming that the three components are important aspects of both curriculum theory and teaching, this study proposes curriculum in use as a proper focal point to build a theoretical model of different curricular approaches upon which different types of research on teaching may be based.

I propose an enlargement of Clark's perspective on the field of research on teaching to encompass three curricular theoretical paradigms. The three paradigms will be considered as bases for developing or improving curriculum in use (see Figure 2).

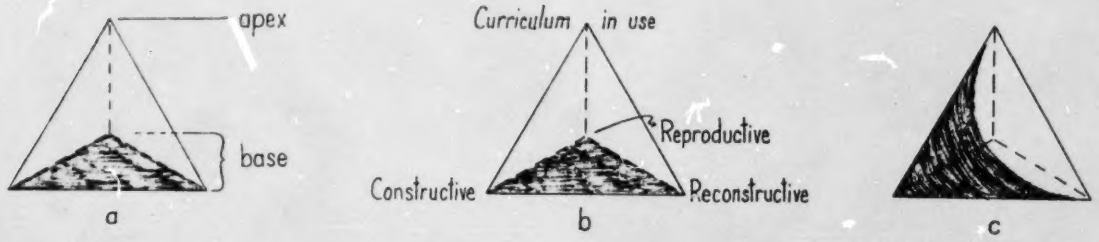


Figure 2. Curricular framework for research on teaching (a tetrahedron).

In the remainder of this paper I will explain the curricular framework, briefly describe the five types (models) of research on teaching identified by Clark, locate each of them on the framework in relation to the three different theoretical approaches and to curriculum in use, then conclude with implications for practitioners such as middle-school teachers. This perspective is multidimensional, represented here as the relationship of the vertices of a tetrahedron: the base vertices represent reproductive,

constructive, and reconstructive modes of inquiry, and the apex, teacher-researcher development of curriculum in use (see Figure 2). This model relates curricular theories to each other and to practice. Types of research methods can be located at vertices and shaded to extend on the faces of the tetrahedron toward other vertices, depending upon how closely the studies reflect the different theoretical approaches or are integrated with practice (see Figure 2). For example an ethnographic study, a constructive method, might also integrate a reconstructive approach and work collaboratively with teachers as they create curriculum with their students. Each of the three curricular theories identified in the model is based on different epistemologies that determine if knowledge is to be transmitted, constructed, or reconceptualized.

Reproductive Approach

The reproductive approach to research on teaching has been categorized by others as empirical-analytic, behavioral science, received perspective, traditionalist, technocratic, structural-functional, positivist and formal discipline (Bourdieu, 1973; Eggleston, 1977; Giroux, 1981; Heyman, 1981; Karabel & Halsey, 1977; Kliebard, 1982; McCutcheon, 1981; Pinar, 1978; Popkewitz & Tabachnick, 1982).

I propose the use of the term "reproductive" because from this perspective (the teacher is viewed as one who transmits or reproduces predetermined curricular goals), it has an assumed quantitative or scientific research base, and corresponds to a traditional curricular theorist's view of teaching practices (e.g., Doll, 1964; Hirst, 1974; Johnson, 1967; Phenix, 1964; Tyler, 1949). Traditionalisits focus on subject matter, prescribe and organize knowledge into orderly fields of study before presenting this "objective" package to teachers who, in turn, are expected to uncritically

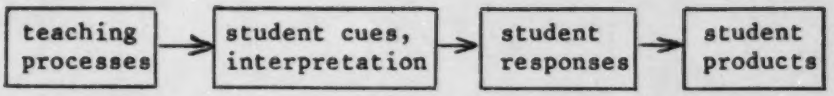
pass it on to students for their absorption. Outcomes, what students learn, must correspond with the prespecified goals or objectives. Research studies arising from this perspective assume that, insofar as the teacher is a deficient instrument, the "perfect" curricular package will not be transmitted to students; thus, experiments must be conducted to determine how methods and resources that the teacher uses can be made more efficient. Generalizations derived from such studies are of more interest to policymakers than to teachers because the policymaker, rather than the teacher, is seen as determiner of curriculum or curricular practice.

My position is that the likenesses (e.g., knowledge exists objectively, apart from the knower; curriculum goals are determined in advance, apart from enacted curriculum negotiated between teachers and students) among the models (process-product, Carroll, and aptitude-treatment interaction) that Clark assigned to the quantitative or reproductive approach, are more significant or crucial than their differences (e.g., the Carroll model focuses on effects of time allocation and selection of resources; the ATI model emphasizes match of students' learning styles with type of group-learning resources). The likenesses indicate philosophical agreement.

Characteristics of these three research approaches are described more specifically below.

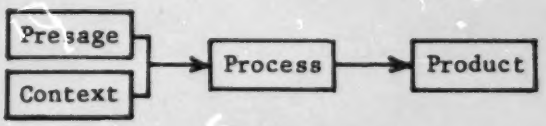
Process-product research. Process-product researchers assume that certain kinds of teacher behavior are causally related to student achievement or attitudes, and that the teacher is commonly concerned with content that can be tested or measured (e.g., facts, principles, vocabulary). The early model resulting from such beliefs or assumptions is that teacher behavior causes or predicts student outcomes. Later Doyle (1978) challenged this model, claiming that both ecological factors and students' behaviors also influenced what was

learned. Consequently additional links, categories of variables, were added to the linear model:



(Gage, 1978, p. 73)

Over 10,000 studies completed before 1950 used the earlier process-product model; a burgeoning number of studies completed later took account of mediating factors that Doyle introduced to the model. A vast number of process-product studies are reported in two handbooks of research on teaching published by the American Educational Research Association, one edited by Gage (1963), the other by Travers (1973) and Bellack (1981). Dunkin and Biddle (1974) organized and reviewed process-product studies according to categories similar to those proposed by Doyle (1978) namely, teacher characteristics (presage variables), student experiences and environmental conditions (context variables), changes in student behavior resulting from student-teacher interaction in the classroom (process variables), and student outcomes (product variables). A simplified model showing the linkages among these variables is the following:



Process-product researchers have adapted methods of data collection and analyses from the behavioral sciences, especially those of psychology and sociology. Prevailing methods have been procedures that describe teaching behavior in a quantified manner, systematic correlations of descriptive variables (e.g., teaching behavior, student achievement), and experiments that further test causal hypotheses explored in correlational studies. Bellack

(1981), Clark (1979), Gage (1978) and researchers in general recognize these three methods as parts of the "descriptive-correlational-experimental loop" identified by Rosenshine and Furst (1973).

Although findings of different process-product studies often conflict, Brophy (1979) describes a finding common to several research studies (e.g., Bennett, 1976; Gage, 1978; and Good, 1979), namely, that student outcomes resulting from teacher-directed approaches are superior to student outcomes resulting from individualized or discovery approaches. In general, process-product studies have dealt with classroom investigations of pacing and student opportunities to learn, direct versus indirect instruction, and open vesus traditional teaching. Gage (1978), however, concludes that preinstructional student variables have accounted for more variance in student achievement than have teaching variables. Because this may be due to limitations inherent in studies of one teacher over a year or less, Gage suggests that researchers develop ways to evaluate cumulative effects of teacher variables on students over successive teachers. Both Brophy (1979) and Gage (1978) suggest the need for researchers to better specify process variables, indicate their relationship to one another and to classroom contexts, and to do more experimental work.

Carroll model research. Carroll (1963) investigated the nature of student tasks and how task accomplishment could be measured in terms of time. He believed that students could reach predetermined goals if the teacher allotted them sufficient time and if the students devoted the necessary time to complete the assigned tasks. Carroll proposed that the degree of learning is a function of a ratio of the amount of time a student spends on a task to the amount of time the student needs to complete the task. This model in which time is the central variable was adapted by other researchers, in particular, Bloom (1974), Harnischfeger and Wiley (1978), and Berliner (1979).

Whereas Carroll related performance on a task to quality of instruction, Bloom focused on how performance on one task preconditioned success on another; Harnischfeger and Wiley distinguished aspects of student learning conditions and task engagement; and Berliner focused simultaneously on student use of time and the curriculum content (academic learning time).

Methods of data collection for research-on-time studies include pretesting on intelligence and ability to predict time needed to complete tasks, observations of overt student learning activities, teacher logs of time allocations for different tasks, and posttesting for achievement outcomes. Correlations are then made, for example, among entry behavior and quality of instruction, time on task and achievement measures. Smyth (Note 2) summarizing findings of the Beginning Teacher Evaluation Study (BTES) reported, for instance, that amounts of time teachers allocated to instruction in a particular area are positively related to learning in that area, and that teachers' abilities to diagnose student skill levels, prescribe appropriate tasks, and provide appropriate feedback, are related to student achievement. Smyth suggests that future research into aspects of student engagement with learning tasks be investigated with descriptive studies (e.g., that existing coding systems be supplemented with field notes), observational introspective studies (e.g., on site observations complemented with stimulated recall), and clinical interventions designed to modify teaching behavior and improve engagement levels of students.

Aptitude-treatment interaction research. Aptitude-treatment interaction researchers seek to match optimal educational programs or learning situations (treatment variables) insofar as they benefit certain types of individual learners (person variables) (Cronbach & Snow, 1977). Aptitude-treatment interaction (ATI) researchers must assume, if they expect interpretable findings, that both aptitudes and treatments should be few, easily defined, stable,

measurable, and that statistical analyses of interactions will sufficiently explain the teaching-learning process (Coe, Note 3). The ATI approach can be described as a prediction of behavior based on interaction of individuals with their environment, statistically defined in terms of significant disordinal (or ordinal) interactions (Hunt, Note 4).

Cronbach first recommended the ATI model in 1957, but 20 years later Cronbach and Snow (1977) pointed to a need for a radical change in thinking about ATI[2]: They concluded that to assume that ATI operates independently in different individuals is to ignore the existence of social effects, thus classes or groups rather than individuals should be the unit of analysis from which to derive statistical inferences (Greene, 1980).

ATI researchers combine correlational and experimental methods of the behavioral sciences. Typically two different treatment groups are compared. Students complete, for example, aptitude measures at the beginning of a study and achievement and attitude measures at the end. Regression analyses are used to show whether or not interactions with treatment variables (e.g., whether individual students learn more about fractions when working in large group settings or in small group settings) are significant (Peterson & Janicki, Note 5). Well established findings, however, are scarce: Many reports have been rejected because of unsatisfactory procedures; few studies have been replicated; and, at times, results of similar studies are inconsistent. Thus, acceptable findings should lead to further research rather than to educational practice (Cronbach & Snow, 1977). Cronbach (1975) suggests to researchers a reversal of priorities. Observers should not only take into account variables that are controlled, but also carefully attend to

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[2]Cronbach and Snow (1977) and Berliner and Cohen (1973) have reviewed earlier ATI studies; Snow (1976) and Miller (1981) have reviewed newer studies.

uncontrolled conditions. Generalizations should become working hypotheses rather than conclusions.

Fit of approaches within framework. How do the three types of research just described fit into the curriculum framework (see Figure 2)? I agree with Clark that all three approaches fit the overall description of the quantitative (reproductive) paradigm. Their focus is primarily on student attainment of predetermined skill objectives that are measurable. Their ultimate objective, the "what" of curriculum, is assumed, reified, and remains largely unquestioned. But even the methods are non-negotiable. Methods must be the most efficient ones for attaining the predetermined objectives, and must be manipulable or controlable. All three types of research emphasize teacher effectiveness. There is little need to distinguish them, though the Carroll model emphasizes particular teaching variables such as allocation of time and selection of appropriate resources, and the ATI model emphasizes environmental conditions--both models seeking to insure that all students reach predetermined goals in the most efficient manner. Thus the ultimate goal--attainment of objectives or preexisting knowledge--remains the same for each model. Because knowledge is predetermined there is little or no cause for researchers to collaborate with teachers to decide the "what" of curriculum, not even about the most efficient methods, because these "must" be handed down (predetermined as in curriculum "packages"--textbooks, kits, etc.), therefore little or no dialogue is necessary. Rather, communication is with policymakers. Thus, I suggest that process product, Carroll model, and ATI types of research can be superimposed upon the reproductive vertex.

Constructive Approach

The constructive approach to research on teaching has been variously called qualitative, ethnographic, reflexive, phenomenological,

anthropological, naturalistic, interpretive, and symbolic science (Bellack, 1981; Eggleston, 1977; Karabel & Halsey, 1977; Magoon, 1977; McCutcheon, 1981; Popkewitz, 1981; Robinson, 1974). Although the labels "qualitative" or "ethnographic" may have most frequent usage, I contend that the label constructive (or constructivist) is most appropriate in reference to curriculum content because

> just as individual scientists and scientific communities develop constructs, constructivists point out that individuals in their societies do precisely the same thing; i.e., invent, organize, and act via rules; and that social and behavioral scientists can and should study both this process as well as the end product. (Magoon, 1977, pp. 652-653)

In contrast to the reproductive approach, which conceptualizes teachers as receptors and transmitters and students as receptors of predetermined knowledge (the "end product"), the constructive approach characterizes teachers and students as processors--creators and constructors of curriculum content.

Clark (1979) associates two types of research with the qualitative (constructive) paradigm, namely ethnographic and teacher thinking. A synopsis of each follows.

Ethnographic research. Ethnographers assume that people acquire knowledge by organizing complexities of the social contexts in which they find themselves. In research on teaching they seek to understand the framework by which teachers and students interpret their thoughts, feelings and actions, and how classroom settings affect behaviors of participants in these settings (Bellack, 1981; Wilson, 1977). Thus, the implicit model for ethnographic research is not prescriptive, linear, and outcome oriented as in the quantitative or reproductive paradigm, but rather descriptive, interactive, and process oriented.

Reviewers of ethnographic studies (e.g., Magoon, 1977; Wilson, 1977) have emphasized approaches rather than findings. Bellack (1981) suggests that

influences on ethnographic approaches have mainly been on research priorities guided by proponents of three schools of thought: phenomenological--focusing on subjective meanings of teachers and students (e.g., Berger & Luckmann, 1967; Schutz, 1967); ethnomethodological--viewing teachers and students as active interpreters and constructors of classroom social reality through ongoing negotiation (e.g., Garfinkel, 1967; Mehan, 1976); and symbolic interaction--defining the classroom situation as constrained by its physical, temporal, and organizational context and by the personal backgrounds of teachers and students (e.g., Keddie, 1971; Waller, 1932).

Ethnographic methods aim at discovering teachers' and students' intentions and at gaining understanding of teaching by describing the flow of classroom events as perceived by participants in these events. Different types of data are collected (e.g., field notes, interviews, videotapes, school and classroom artifacts) so that findings can be compared by triangulation and hypotheses validated (Bellack, 1981; Clark & Florio with Elmore, Martin, Maxwell, & Metheny, Note 6). Findings of ethnographic studies include revelation of the hidden curriculum--teachings and learnings taking place in the classroom that are not part of the teacher's formal or explicit plan (e.g., Jackson, 1968; Cusick, 1973; Willis, 1977).

What further explorations for ethnography are recommended? Although Erickson (1977) warns that the ethnographic approach should not be compromised and needs a more differentiated theory of social relationships, Rist (1977) suggests that a new language and conceptual framework is needed to locate the qualitative and quantitative paradigms in relation to each other. In addition, Clark and Florio with others (Note 6) and Smith (1981) propose closer collaboration of researchers with teachers.

Teacher thinking research. How do teachers think about their instructional problems and their students? Researchers asking this question

assume that teachers are rational and that they deal with complex classroom situations. Researchers of teacher thinking investigate the psychology of teacher planning and how teachers process information during classroom interaction. Two prevailing teacher thinking models are the following: (1) a decision-making model in which teaching situations are defined for the teacher, and (2) an information-processing model in which teachers, influenced by their implicit theories or belief systems, define the teaching situation (Clark & Yinger, 1979; Clark, Note 7).

Shulman and Elstein (1975) reviewed literature on early models of psychological research that have implications for teacher thinking. Clark and Yinger (1979) reviewed teacher thinking studies that have recently emerged and further classified them into four areas of investigation: teachers' planning, judgment, interactive decision making, and implicit theories.

Methods employed in the four topic areas delineated by Clark and Yinger (1979) include the following processes of data collection and analyses: (1) teacher planning and judgment research tended to use prescriptive and "close-ended" methods (e.g., questionnaires, laboratory "think aloud" procedures, written plans of teachers in simulated settings, statistical regressions), whereas (2) interactive decision making and implicit theory research tended to use descriptive and more open-ended approaches (e.g., self reports through stimulated recall using videotapes, participant observation, interviews, journal keeping, processes of coding and classification, descriptive comparisons and model building) (e.g., Clark & Florio et al., Note 6). Examples of findings in each of the four areas follow.

1. Teacher planning: Teachers spent more time planning content, strategies, and activities than planning teaching objectives (Peterson, Marx & Clark, 1978).

2. Teacher judgment: Teachers modified their judgments significantly as a result of participation in training and feedback sessions (Mondol, 1973).

3. Interactive decision making: Teachers made decisions most often when students interrupted the instructional process.

4. Implicit theories: In general, researchers commonly assume that teachers are often not aware of the sets of beliefs that influence their planning and instruction.

Clark and Yinger (1979) suggest that in the future research on teacher thinking and behavior may be may integrated with curriculum and may yield a practical theory of instruction.

How do the ethnographic and teacher thinking types of research fit into the curriculum framework (Figure 2)? In general I agree with Clark that the two types of research are qualitative (constructive) in approach--they both investigate curriculum in use from the perspective of participants'--teachers and students--intentions and interpretations, and examine behaviors and interactions in the classroom setting. Particular researchers, however, claiming to be ethnographers, have preformulated research problems, specifying pre-existing, rigid, analytic frameworks and precise activities to be observed before any on-site visits, rather than allow issues and problems to emerge from extensive time in fieldwork (Rist, 1980, p. 9). Thus, insofar as research variables are preselected, and consequent range of research outcomes are predetermined, the research study moves away from the constructive vertex and towards the reproductive one. Similarly, insofar as research on teacher thinking methods are prescriptive and close-ended and ignore the interactive influences of teachers and students in naturalistic classroom activities, such research studies would also be located in closer relation to the reproductive vertex (Figure 2).

Reproductive studies in which researchers treat practitioners detachedly as scientific objects of study (and consequently little or no collaborative decision making takes place) stand in contrast to constructive studies researchers (e.g., as participant observers) who interact with teacher

practitioners and students, and even involve teachers in an ongoing process of generating hypotheses and in making decisions about data yet to be collected (e.g., Clark & Florio et al., Note 6). Thus constructivist researchers, who become involved in seeing how curriculum unfolds in the classroom, would be more likely to stimulate teacher development of curriculum than reproductionists, who assume that "curriculum" will be handed to teachers by "experts" and expect that teachers will pass it on in unadulterated forms. Hence, I would extend constructive studies closer to the apex (see Figure 2c) than reproductive studies to show greater constructive researcher interaction with curriculum in use, as created by practitioners.

Reconstructive Approach

The reconstructive approach to research on teaching has otherwise been called critical science, the "new" sociology of education, neo-Marxism, and a restructuring perspective (Eggleston, 1977; Giroux & Penna, 1979; Heyman, 1981; McCutcheon, 1981; Pinar, 1978; and Popkewitz & Tabachnick, 1982). The reconstructive approach views teachers neither as passive receptors and reproducers, nor merely as constructors of curriculum within norms and ideologies of the prevailing culture, but as critical perceivers who act to reconstruct oppressive societal structures (e.g., economies, language, political structures). The reconstructivist teacher engages students as co-investigators in processes of identifying, critically reflecting upon, and taking action to transform dehumanizing situations (e.g., Freire, 1981; Molnar & Zahorik, 1977).

The critical theorist's methodology is critical reflection on practice (Molnar & Zahorik, 1977). I propose that researchers on teaching investigate ways that teachers become enmeshed in dehumanizing school practices, and ways that teachers contribute to or are hindered from carrying out a reconstructive

curriculum. Theorists have begun to ground their constructs in empirical data of descriptive studies (e.g., Anyon, 1981; Apple & King, 1977; Willis, 1977). Moving beyond traditional ethnographic approaches in which researchers describe events primarily from the participants' point of view, critical descriptive studies interpret data with reference to wider social contexts and theoretical considerations to reveal multiple meanings and ideological dimensions of classroom activity. Researchers critique phenomena in light of these interpretations and call for change in practice or theory (McCutcheon, 1981; King, Note 8).

If the researcher engages the teacher as co-investigator as the teacher does with students, this approach will be a promising one for integrating and improving theory, research, and practice.

Implications for Practice

Practitioners need to become explicitly aware of their own theories of curriculum and of how they express these theories in practice. By becoming aware of how research on teaching relates to theories of curriculum, teachers can better select and use such studies as guides for practice. Middle-school teachers, in particular, who are caught between the typically more open, integrative, and student-centered approaches of the elementary school, and the more closed, departmentalized, and subject-centered structures of traditional high schools need to understand the underlying theories of each insofar as the approaches influence components of their own curriculcum. Middle school teachers can then better interpret their own roles in curriculum development. For example, rather than select one theory and a related research field from which to draw, they may wish especially to attend to constructive approaches for better understanding of emerging needs and interests of adolescent students, to reproductive approaches for more effective ways to teach skills

essential for grasping high-school subject matter, and to reconstructive approaches for discovering and implementing changes to meet needs of society.

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